

Amendments to the Claims:

This listing of claims replaces all prior versions and listings of claims in the application:

Listing of Claims:

1. (Currently Amended) A computer-implemented method for generating a portion of an image, the method comprising:
  - receiving an identification of a modification region in an original image;
  - calculating a differential representation of an image texture region;
  - calculating a differential representation of boundary pixels in the original image, wherein at least some of the boundary pixels are outside of and adjacent to the modification region;
  - generating new differential pixel values for the modification region using the differential representation of the image texture region to obtain substantial consistency with the differential representation of the boundary pixels; and
  - integrating the new differential pixel values to obtain a modified image.
2. (Original) The method of claim 1 further comprising using the modified image as a replacement for the modification region of the original image.
3. (Original) The method of claim 1 further comprising receiving an indication of an area in the original image that comprises the image texture region.
4. (Previously Presented) The method of claim 3 wherein the image texture region is derived from a portion of the original image that overlaps at least one of the modification region or the boundary pixels.

5. (Original) The method of claim 1 further comprising receiving an indication of an area in an image, other than the original image, that comprises the image texture region.
6. (Original) The method of claim 1 wherein calculating a differential representation comprises determining derivatives using a predefined kernel.
7. (Original) The method of claim 6 wherein calculating a differential representation comprises calculating a multi-channel differential representation.
8. (Original) The method of claim 1 wherein calculating a differential representation comprises calculating at least a second order differential representation.
9. (Original) The method of claim 1 wherein generating new differential pixel values comprises performing texture synthesis to obtain a substantially consistent texture between the differential representation of the boundary pixels and the new differential pixel values.
10. (Original) The method of claim 9 wherein performing the texture synthesis comprises using samples of the differential representation of the image texture region to generate the new differential pixel values starting from the differential representation of the boundary pixels.
11. (Original) The method of claim 1 wherein the new differential pixel values collectively form a new differential representation for the modification region.
12. (Original) The method of claim 11 wherein integrating the new differential pixel values to obtain the modified image comprises iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the new differential representation of the modification region.

13. (Original) The method of claim 12 wherein the partial differential equation comprises a Poisson differential equation.
14. (Original) The method of claim 13 wherein the boundary pixels in the original image provide Dirichlet boundary conditions for the Poisson differential equation.
15. (Original) The method of claim 11 wherein the new differential representation for the modification region has an original resolution, wherein integrating the new differential pixel values to obtain a modified image comprises:
  - resampling the original-resolution new differential representation of the modification region to a lower-resolution new differential representation of the modification region;
  - calculating new lower-resolution pixel values for the modification region by iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the lower-resolution new differential representation of the modification region;
  - resampling the new lower-resolution pixel values for the modification region to the original resolution to produce approximate original-resolution pixel values; and
  - calculating new original-resolution pixel values for the modification region by starting from the approximate original-resolution pixel values and by iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the original-resolution new differential representation of the modification region.
16. (Original) The method of claim 1 further comprising separating the original image into multiple channels, wherein calculating the differential representation of the image texture region, calculating the differential representation of the boundary pixels, generating the new differential pixel values, and integrating the new differential pixel values to obtain a modified image are performed for each of the multiple channels.

17. (Original) The method of claim 1 further comprising receiving an indication of a plurality of areas in the original image that collectively comprise the image texture region.
18. (Currently Amended) A computer-implemented method for modifying an image, the method comprising:
- calculating a differential representation of at least a portion of an original image;
  - calculating a differential representation of at least a portion of a texture source image;
  - performing texture synthesis using samples of the texture source image differential representation, wherein texture synthesis is performed starting from a boundary of the original image differential representation and performing the texture synthesis generates a synthesized differential representation; and
  - generating a modified image from the synthesized differential representation by solving a partial differential equation.
19. (Original) The method of claim 18 wherein the calculated differential representations are of a type selected from a group consisting of a gradient, a Laplacian, a gradient of the Laplacian, and a second Laplacian.
20. (Original) The method of claim 18 wherein the partial differential equation comprises a Poisson differential equation having a form selected from the group consisting of  $\Delta f = \nabla \cdot s$ ,  $\Delta f = s$ ,  $\Delta \Delta f = \nabla \cdot s$ , and  $\Delta \Delta f = s$ , where  $s$  corresponds to the synthesized differential representation.
21. (Original) The method of claim 18 wherein a boundary of the synthesized differential representation matches the boundary of the original image differential representation.

22. (Original) The method of claim 18 wherein the solution to the partial differential equation satisfies a Dirichlet boundary condition provided by a portion of the original image.
23. (Original) The method of claim 18 wherein solving the partial differential equation comprises iteratively applying at least one kernel and the synthesized differential representation to a selected starting image.
24. (Original) The method of claim 18 wherein the texture source image comprises a region in the original image.
25. (Original) An article comprising a ~~machine~~computer-readable medium storing instructions for causing one or more processors to perform operations comprising:  
receiving an identification of a modification region in an original image;  
calculating a differential representation of an image texture region to produce differential texture pixel values;  
calculating a differential representation of boundary pixels in the original image to produce differential boundary pixel values, wherein at least some of the boundary pixels are outside of and adjacent to the modification region;  
generating new differential pixel values for the modification region using the differential texture pixel values to obtain substantial consistency with the differential boundary pixel values; and  
integrating the new differential pixel values to obtain a modified image.
26. (Original) The article of claim 25 wherein the machine-readable medium stores further instructions for causing one or more processors to perform operations comprising using the modified image as a replacement for the modification region of the original image.

27. (Original) The article of claim 25 wherein the machine-readable medium stores further instructions for causing one or more processors to perform operations comprising receiving an identification of at least one image texture area, wherein the image texture region comprises the at least one identified image texture area.
28. (Original) The article of claim 25 wherein calculating the differential representation of the image texture region and calculating the differential representation of the boundary pixels comprises determining derivatives using at least one predefined kernel.
29. (Original) The article of claim 25 wherein generating new differential pixel values for the modification region comprises generating a differential texture pattern that matches a differential texture pattern of the image texture region.
30. (Original) The article of claim 25 wherein integrating the new differential pixel values to obtain the modified image comprises iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the new differential representation of the modification region.
31. (Original) The article of claim 30 wherein integrating the new differential pixel values to obtain the modified image comprises iteratively integrating differential pixel values at progressively higher resolutions beginning at a low resolution.
32. (Original) The article of claim 25 wherein the original image, the image texture region, and the modified image correspond to one channel of a multiple channel image.
33. (Currently Amended) A computer-implemented method for modifying an image, the method comprising:  
receiving an identification of a modification region in an original image;  
determining a boundary region in the original image, wherein the boundary region

is adjacent to the modification region;  
performing texture synthesis in differential space using the boundary region to  
produce a synthesized differential representation for the modification region; and  
integrating the synthesized differential representation to generate a modified  
image.

34. (Original) The method of claim 33 wherein integrating the synthesized differential representation comprises calculating a solution to a partial differential equation having a source term corresponding to the synthesized differential representation.
35. (Original) The method of claim 34 wherein the partial differential equation comprises a Poisson differential equation.
36. (Original) The method of claim 35 wherein performing texture synthesis in differential space comprises:  
calculating a Laplacian of the boundary region to produce differential boundary pixel values;  
calculating a Laplacian of a texture region to produce differential texture pixel values; and  
selecting samples of the differential texture pixel values for use in generating the synthesized differential representation.
37. (Original) The method of claim 33 wherein performing texture synthesis comprises selecting samples from a texture image that match the boundary region in differential space.
38. (Original) The method of claim 37 wherein the texture image corresponds to a differential space representation of a texture region in the original image.

39. (Currently Amended) A computer-implemented method for generating a modified image, the method comprising:
- receiving an identification of a modification region in an original image;
  - calculating a differential representation of at least a portion of a texture source image;
  - copying samples of the texture source image differential representation to a location corresponding to the identified modification region to generate a new differential representation for the modification region; and
  - integrating the new differential representation for the modification region to produce a modified image.
40. (Original) The method of claim 39 further comprising using the modified image as a replacement for the modification region of the original image.
41. (Original) The method of claim 39 wherein the samples of the texture source image differential representation are copied to a location within a differential representation of at least a portion of the original image.
42. (Original) The method of claim 39 further comprising receiving an identification of the texture source image, wherein the texture source image comprises a portion of the original image.
43. (Original) The method of claim 39 further comprising receiving an identification of the texture source image, wherein the texture source image comprises at least a portion of a different image from the original image.
44. (Original) The method of claim 39 wherein copying samples of the texture source image differential representation to a location corresponding to the identified modification region comprises filling a region corresponding to the identified modification region with samples of the texture source image differential representation.



45. (Original) The method of claim 44 wherein multiple different samples are available in the texture source image differential representation.
46. (Original) The method of claim 39 wherein integrating the new differential representation for the modification region to produce a modified image comprises calculating a solution to a partial differential equation.
47. (Original) The method of claim 46 wherein integrating the new differential representation for the modification region to produce a modified image comprises using a boundary region adjacent to the modification region in the original image to provide boundary conditions for calculating the solution to the partial differential equation.
48. (Currently Amended) A computer-implemented method for modifying an image, the method comprising:  
receiving an identification of a modification region in an original image;  
determining a rate of change between pixels across a region of a texture source image;  
applying the rate of change to the modification region; and  
determining new pixel values for the modification region that exhibit the rate of change and that exhibit consistency with boundary pixel values adjacent to the modification region in the original image.
49. (Previously Presented) An article comprising a ~~machine~~computer-readable medium storing instructions adapted to cause data processing apparatus to perform operations comprising:  
receiving an identification of a modification region in an original image;  
determining a rate of change between pixels across a region of a texture source image;  
applying the rate of change to the modification region; and

determining new pixel values for the modification region that exhibit the rate of change and that exhibit consistency with boundary pixel values adjacent to the modification region in the original image.

50. (Previously Presented) The article of claim 49 wherein the instructions are adapted to cause data processing apparatus to:

determine a rate of change between pixels across a region of a texture source image by calculating a differential representation of the texture source image;  
apply the rate of change to the modification region by:

calculating a differential representation of at least a portion of an original image; and

performing texture synthesis using samples of the differential representation of the texture source image, wherein texture synthesis is performed starting from a boundary of the original image differential representation and performing the texture synthesis generates a synthesized differential representation; and

determine new pixel values for the modification region by generating a modified image from the synthesized differential representation by solving a partial differential equation.

51. (Previously Presented) The article of claim 50 wherein the at least a portion of the original image comprises pixels outside of and adjacent to the modification region.

52. (Previously Presented) The article of claim 51 wherein the instructions are adapted to cause data processing apparatus to determine new pixel values for the modification region by using a boundary region adjacent to the modification region in the original image to provide boundary conditions for solving the partial differential equation.

53. (Previously Presented) The article of claim 51 wherein the instructions are adapted to cause data processing apparatus to generate a modified image from the

synthesized differential representation by iteratively applying at least one kernel to generate a solution to the partial differential equation having a source term corresponding to the new differential representation of the modification region.

54. (Previously Presented) The article of claim 50 wherein the samples of the differential representation of the texture source image have an original resolution, and the instructions are adapted to cause data processing apparatus to generate a modified image from the synthesized differential representation by:

- resampling the original-resolution samples to lower-resolution samples;
- calculating new lower-resolution pixel values for the modification region by iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the lower-resolution samples;
- resampling the new lower-resolution pixel values for the modification region to the original resolution to produce approximate original-resolution pixel values; and
- calculating new original-resolution pixel values for the modification region by starting from the approximate original-resolution pixel values and by iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the original-resolution samples, wherein the new pixel values for the modification region comprise the new original-resolution pixel values.

55. (Previously Presented) The article of claim 50 wherein the instructions are adapted to cause data processing apparatus to calculate a differential representation by at least one of:

- determining derivatives using a predefined kernel;
- calculating a multi-channel differential representation; or
- calculating at least a second order differential representation.

56. (Previously Presented) The article of claim 50, wherein the instructions are adapted to cause data processing apparatus to generate a modified image from the synthesized differential representation by iteratively integrating differential pixel values

in the synthesized differential representation at progressively higher resolutions beginning at a low resolution.

57. (Previously Presented) A system comprising:

at least one memory adapted to store at least one of image data or instructions for processing image data;

at least one processor configured to:

receive an identification of a modification region in an original image;

determine a rate of change between pixels across a region of a texture source image;

apply the rate of change to the modification region; and

determine new pixel values for the modification region that exhibit the rate of change and that exhibit consistency with boundary pixel values adjacent to the modification region in the original image.

58. (Previously Presented) The system of claim 57 wherein the at least one processor is further configured to:
- determine a rate of change between pixels across a region of a texture source image by calculating a differential representation of the texture source image;
  - apply the rate of change to the modification region by:
    - calculating a differential representation of at least a portion of an original image; and
    - performing texture synthesis using samples of the differential representation of the texture source image, wherein texture synthesis is performed starting from a boundary of the original image differential representation and performing the texture synthesis generates a synthesized differential representation; and
  - determine new pixel values for the modification region by generating a modified image from the synthesized differential representation by solving a partial differential equation.
59. (Previously Presented) The system of claim 58 wherein the at least a portion of the original image comprises pixels outside of and adjacent to the modification region.
60. (Previously Presented) The system of claim 59 wherein the at least one processor is further configured to determine new pixel values for the modification region by using a boundary region adjacent to the modification region in the original image to provide boundary conditions for solving the partial differential equation.
61. (Previously Presented) The system of claim 59 wherein the at least one processor is further configured to generate a modified image from the synthesized differential representation by iteratively applying at least one kernel to generate a solution to the partial differential equation having a source term corresponding to the new differential representation of the modification region.

62. (Previously Presented) The system of claim 58 wherein the samples of the differential representation of the texture source image have an original resolution, and the at least one processor is further configured to generate a modified image from the synthesized differential representation by:
- resampling the original-resolution samples to lower-resolution samples;
  - calculating new lower-resolution pixel values for the modification region by iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the lower-resolution samples;
  - resampling the new lower-resolution pixel values for the modification region to the original resolution to produce approximate original-resolution pixel values; and
  - calculating new original-resolution pixel values for the modification region by starting from the approximate original-resolution pixel values and by iteratively applying at least one kernel to generate a solution to a partial differential equation having a source term corresponding to the original-resolution samples, wherein the new pixel values for the modification region comprise the new original-resolution pixel values.
63. (Previously Presented) The system of claim 58 wherein the at least one processor is further configured to calculate a differential representation by at least one of:
- determining derivatives using a predefined kernel;
  - calculating a multi-channel differential representation; or
  - calculating at least a second order differential representation.
64. (Previously Presented) The system of claim 58 wherein the at least one processor is further configured to generate a modified image from the synthesized differential representation by iteratively integrating differential pixel values in the synthesized differential representation at progressively higher resolutions beginning at a low resolution.

65. (New) The method of claim 1, further comprising determining, based on input from a user, at least one of the identification of the modification region or the image texture region.
66. (New) The method of claim 1, further comprising storing the modified image for subsequent display.
67. (New) The method of claim 18, further comprising storing the modified image for subsequent display.
68. (New) The method of claim 33, further comprising storing the modified image for subsequent display.
69. (New) The method of claim 39, further comprising storing the modified image for subsequent display.
70. (New) The method of claim 48, further comprising storing the modified image for subsequent display.